

REMARKS

Claims 1, 7, 8, 13, 14 and 16 have been amended and claims 20-23 have been added herein. Claim 15 was canceled in a previous amendment. Hence, claims 1-14 and 16-23 are currently pending. Applicants respectfully request reconsideration of the captioned application in view of the foregoing amendments and the following remarks.

Drawings

A replacement drawing sheet containing amended Figure 2 is attached. Figure 2 has been amended to illustrate the external cooling source described in the specification. The drawing amendment merely graphically illustrates that which has been verbally described in the specification. No new matter has been introduced via the amendment to Figure 2.

Specification

The written description has been amended to add reference number 151 to the external cooling source in light of the amendment to Figure 2. No new matter has been introduced.

Claim Rejections – 35 U.S.C. § 102

Sections 4-7 of the office action rejected claims 1-3, 5, 6, 8, 9, 11 and 13-16 under 35 USC 102(b). More specifically, section 5 rejected claims 1-3, 5, 8, 9 and 13-15 as allegedly being anticipated by U.S. Patent No. 4,315,300 to Parmerlee et al (“Parmerlee”); section 6 rejected claims 1, 3 and 6 as allegedly being anticipated by U.S. Patent No. 5,471,850 to Cowans (“Cowans”); and section 7 rejected claims 1, 3, 6, 8, 9, 11, 13, 14 and 16 as allegedly being anticipated by U.S. Patent No. 6,205,796 to Chu et al (“Chu”). Applicant respectfully traverses these rejections.

The office action cited passages from MPEP 2106 regarding language that may raise a question as to the limiting effect of language in a claim. However, as stated in the MPEP, the cited language merely “may raise a question” – it does not explicitly identify language that makes a limitation optional. Applicant respectfully contends that, to the extent any of the identified phrases are used, none of the claims presented herein rely on “optional limitations” for patentability. Moreover, MPEP 2106 is entitled “Patentable Subject Matter - Computer-Related Inventions.” The passage cited in the office action comes from MPEP 2106 II, “Determine What Applicant has Invented and is Seeking to Patent” and thus appears to be directed to identifying inventions in computer-related inventions.

On the other hand, MPEP 2131 is directed specifically to “Anticipation.” It states, “TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM.” (emphasis in original). Moreover, citing *In re Bond*, MPEP 2131 notes, “The elements must be arranged as required by the claim.” 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The *Parmerlee*, *Cowans* and *Chu* references fail to disclose each element recited in the claims arranged as required by the claims. Applicant therefore respectfully submits that none of these references can anticipate the claims. These references are addressed in turn below.

Parmerlee (claims 1-3, 5, 8, 9 and 13-15):

Claim 15 was previously canceled, rendering the rejection thereof moot. Regarding claims 1-3, 5, 8, 9, 13 and 14, the office action lists components disclosed in the *Parmerlee* reference: “an enclosure or housing 31; an air-to-liquid [sic] comprising side plates 13 and 14

with flow-through holes 16 through which a coolant flows and with coils 45 and 46; and air vents or slots 18.” Office action at p. 4.

First, independent claims 1, 8 and 13 each require an enclosure having an inlet and an outlet that allow air to enter and exit the enclosure. Figure 2 of Parmerlee is reproduced below, showing the housing 31 identified in the office action with modules 11 situated therein. As understood by Applicant, the office action equates the housing 31 of Parmerlee with the enclosure recited in the claims. However, the office action fails to note where Parmerlee discloses an inlet or an outlet that allows air to enter and exit the housing 31 disclosed therein. Figure 2 of Parmerlee does not appear to illustrate an air inlet or outlet in the housing 31.

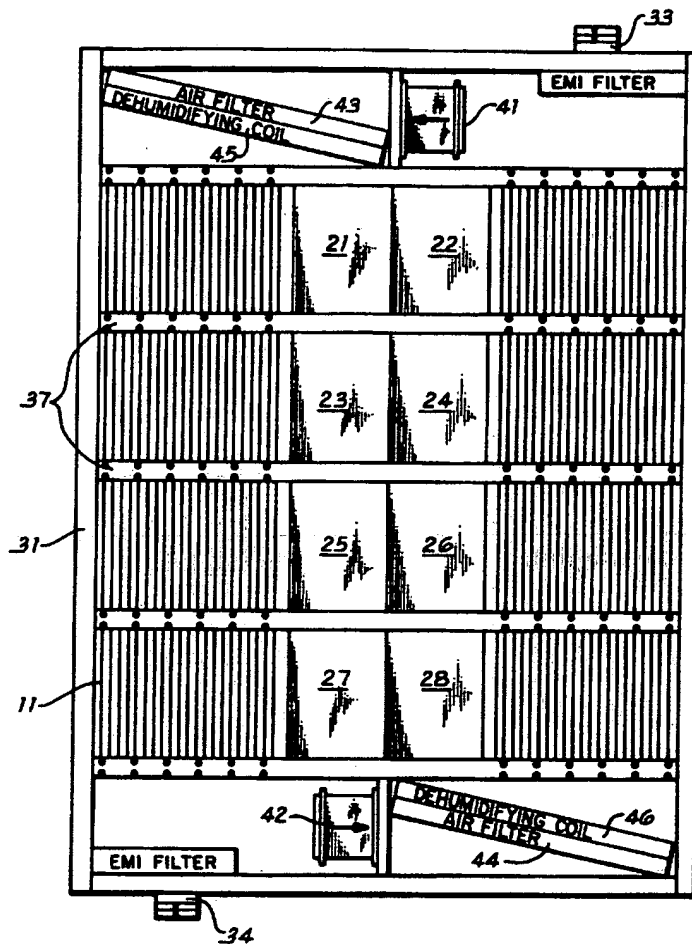


Fig. 2

The office action mentions air vents or slots 18, apparently equating them with the recited inlet and outlet. However, the through slots 18 are not defined by the housing 31 and do not allow air to enter or exit the housing 31. The through slots 18 disclosed in Parmerlee appear to be defined by the side plates 13. As shown in Figure 1 of Parmerlee, the "through slot 18 is provided between adjacent grooves 12." Parmerlee at col. 2, ll. 65-66.

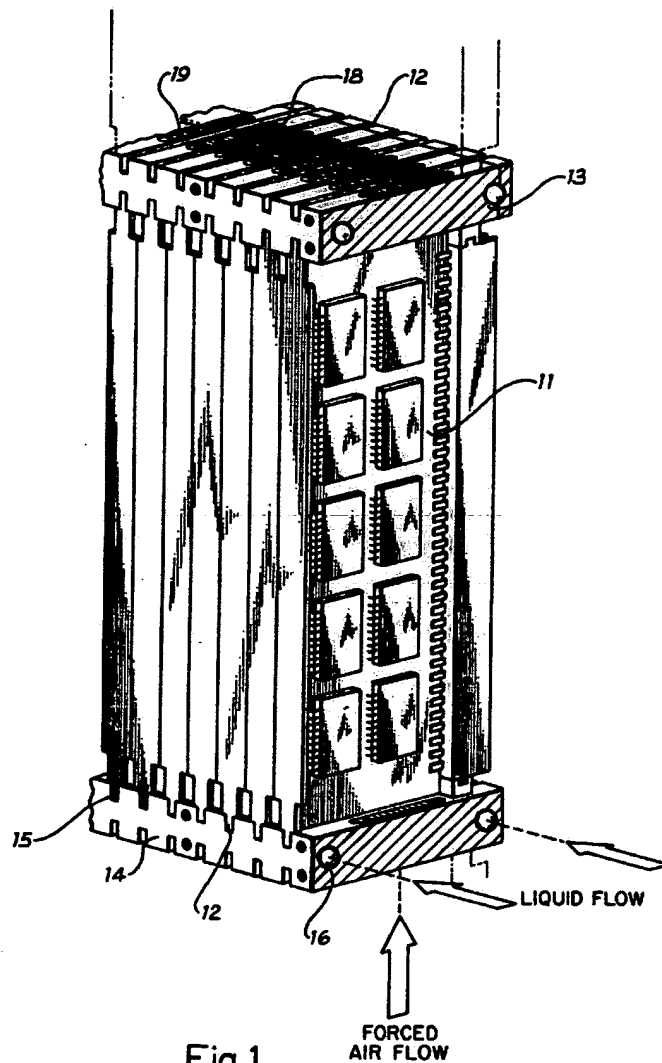


Fig.1

Parmerlee fails to disclose an enclosure having an inlet and outlet arranged as required by claims 1, 8 and 13, and therefore cannot anticipate claims 1, 8 or 13, or any claims depending therefrom.

Further, claims 1 and 8 each recite the air in the environment being at a first temperature level, with the inlet situated relative to the equipment such that the air at the first temperature level absorbs heat from the equipment, increasing the temperature. To the extent that Parmerlee

discloses inlets or outlets (though not in the cabinet 31), the “inlet” is not situated relative to the equipment (module 11) such that air at the temperature of the environment flows around the equipment.

As shown in Figure 1 of Parmerlee above, the forced air flow is upwards. As described in Parmerlee, “a pair of holes 16 are bored the entire length of each side plate and are arranged to carry a cooling liquid, such as a 62% glycol-38% water solution, which is circulated through the side plates.” Col. 2, ll. 57-60. “A through slot 18 is provided between adjacent grooves 12 and a thin reverse-bended baffle 19 is mounted in each slot 18. *Cool air* is directed through these slots and this air moves across the faces of the modules to facilitate the removal of heat.” Col. 2, l. 65 – col. 3, l. 1 (emphasis added).

Thus, Parmerlee does not disclose the elements of claims 1 or 8 arranged as required by the claims. In Parmerlee, the air does not flow from the inlet and over the equipment at the temperature of the environment. With the structural arrangement of Parmerlee, the air is cooled first, then moved across the faces of the modules. Shortcomings of cooling arrangements such as disclosed in Parmerlee are addressed in the present application. For example, cooling the air prior to moving it past the equipment often results in condensation on the equipment. Presumably, this is why the dehumidifying coil 46 shown in Figure 2 of Parmerlee is required.

To prevent condensation, claim 1 further recites a controller that controls the refrigerated fluid flowing through the heat exchanger in response to a temperature sensor to maintain the temperature of the air exiting the heat exchanger above the saturation temperature. As noted above, Parmerlee provides a dehumidifying coil in an attempt to prevent condensation. Accordingly, Parmerlee appears to teach away from preventing condensation using a controller that maintains temperature above the air saturation point.

For any one of these reasons, Parmerlee cannot anticipate independent claims 1, 8 or 13, or any of claims 2, 3, 5, 9 and 14 depending therefrom.

Cowans (claims 1, 3 and 6):

The office action refers to the following components disclosed in Cowans: “an air-to-liquid heat exchanger or subcooler system 20, a fan in fan system 72, and a valve 52.” Office action at p. 5. This list of components from Cowans provided by the office action, however, fails to identify where Cowans discloses each element of the claims, arranged as required by the claims. Figure 1 of Cowans illustrating the components referenced in the office action is reproduced below.

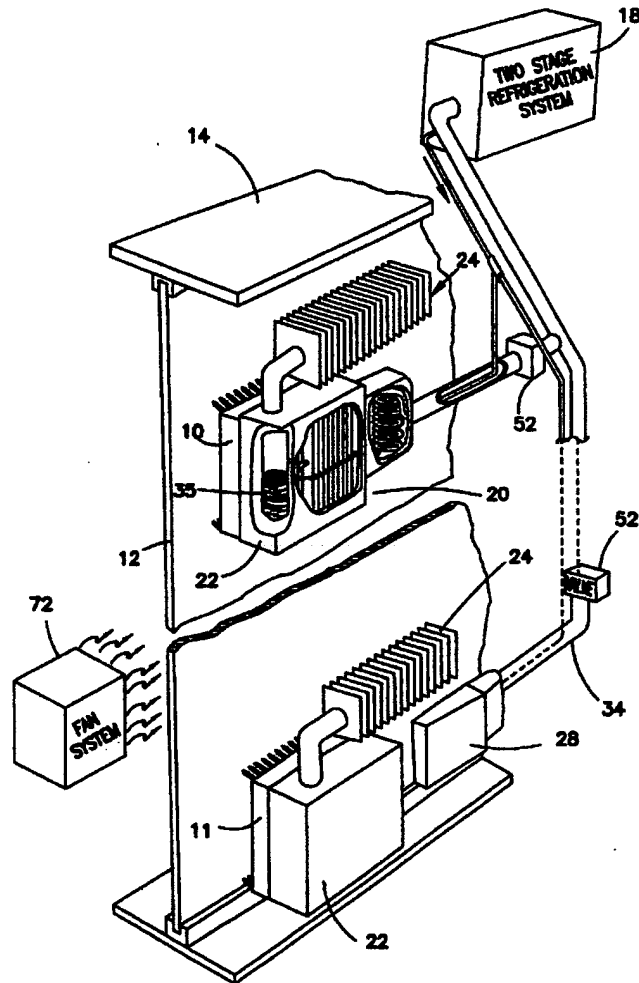


FIG. 1

For example, independent claim 1 requires an air-to-liquid heat exchanger positioned and adapted to remove the heat from the air exiting the enclosure, wherein the heat exchanger expels the heat outside the environment containing the enclosure. The office action fails to identify where Cowans discloses the subcooler system 20 removing heat from air exiting an enclosure. The Figure from Cowans shown above only illustrates a portion of a housing 14, with no illustration of an air outlet allowing cooled air to exit the housing 14. The office action further fails to note where Cowans discloses the subcooler system 20 being structurally positioned to expel heat outside the environment containing the enclosure. Figure 1 of Cowans shows the

subcooler system 20 connected to a two stage refrigeration system 18, but it does not appear to disclose any particular location of the refrigeration system 18.

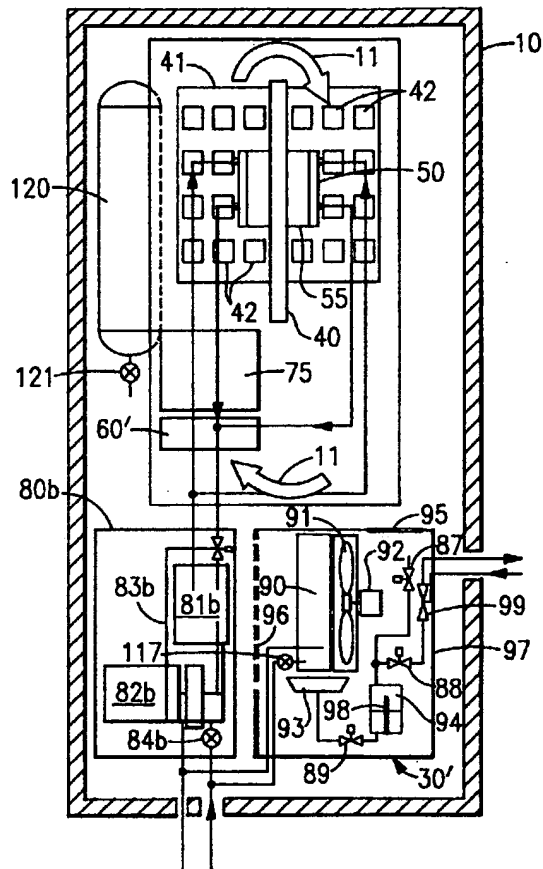
Further, claim 1 recites a controller that controls refrigerated fluid flowing through the heat exchanger in response to a temperature sensor to maintain the temperature of the air exiting the heat exchanger above the saturation temperature, thus preventing condensation. As noted above, the office action fails to identify where Cowans discloses air exiting a heat exchanger. Cowans also does not appear to disclose preventing condensation at all, or more specifically, it does not disclose an controller that controls the subcooler system 20 to maintain temperature of air exiting an enclosure above saturation temperature.

Applicant respectfully submits that Cowans fails to disclose each element recited in claim 1. It therefore cannot anticipate claim 1, or claims 3 and 6 depending therefrom.

Chu (claims 1, 3, 6, 8, 9, 11, 13, 14 and 16):

Regarding Chu, the office action recites, “an enclosure 30’, air inlet 95, air outlet 96, an air-to-liquid heat exchanger 90, a fan 91, and a modulating valve 117. Fan motor 92 is a piece of heat producing equipment. See Figure 3B in particular.” Office action at p. 5. Figure 3B of Chu is reproduced below.

FIG.3B



Claim 1 includes a controller that controls refrigerated fluid flowing through the heat exchanger in response to the temperature sensor to maintain the temperature of the air exiting the heat exchanger above the saturation temperature, thus preventing condensation. The title of the Chu patent is "Sub-dew point cooling of electronic systems." Accordingly, Figure 3B of Chu shown above illustrates a humidity control unit 30' for removing water vapor from the interior of the interior of an enclosure 10 housing electronic equipment. Thus, the humidity control unit 30' disclosed in Chu teaches away from claim 1: it operates at below the saturation temperature, causing moisture to condense and collect in a collector pan 93.

Since the device of Chu identified in the office action does not include a controller that maintains the temperature of the air exiting the heat exchanger above the saturation temperature

in response to a temperature sensor, it cannot anticipate claim 1, or claims 3 and 6 dependent thereon.

Independent claim 8 includes an air-to-liquid heat exchanger situated outside the enclosure adjacent to the air outlet. Chu fails to disclose this structure. The heat exchanger 90 of the humidity control unit 30' is inside its enclosure. Chu therefore cannot anticipate claim 8, or claims 9 and 11 depending therefrom.

Independent claim 13 includes first and second heat exchangers, with the second heat exchanger located outside the environment containing the enclosure and receiving cooling liquid from the first heat exchanger such that the heat absorbed from the equipment is expelled outside the environment containing the enclosure. As noted above, Chu shows a heat exchanger associated with the humidity control unit 30'. Item 83b is also identified as a heat exchanger, but it does not receive cooling fluid from the heat exchanger 90. Further, both heat exchangers 90 and 83b are located inside the enclosure 10.

Therefore, Chu does not anticipate claim 13, or claim 14 depending therefrom.

Independent claim 16 recites a method that includes returning the air to the environment containing the enclosure after the cooling liquid has absorbed the heat therefrom to return the air to the first temperature level. The cited portions of Chu do not disclose such a method step. The purpose of the humidity control unit 30' is to remove moisture from the air to prevent it from condensing on the electronic equipment being cooled. To accomplish this, the air entering the humidity control unit 30' is cooled to below the dew point so that moisture condenses as the

cooled air exits the humidity control unit. The office action does not identify a disclosure in Chu stating that air exits the humidity control unit 30' at the temperature of the air entering the unit.

Chu therefore cannot anticipate claim 16.

Claim Rejections – 35 U.S.C. § 103

Sections 8-9 of the office action rejected claims 4 and 10 under 35 USC 103(a) as allegedly being unpatentable over Parmerlee. Claims 4 and 10 ultimately depend from claims 1 and 8, respectively. Independent claims 1 and 8 are believed to be in condition for allowance as noted in the remarks provided above. Claims 4 and 10 are thus allowable for at least the same reasons, and further analysis is unnecessary.

Allowable Subject Matter

Section 10 of the office action identified claims 7, 12 and 17-19 as containing allowable subject matter. The Examiner's acknowledgement of the allowable claims is appreciated.

New claim 20 combines the subject matter of claims 1, 6 and 7 as they existed prior to the amendments presented herein. New claim 20 is therefore intended to represent claim 7 in independent form.

New claim 21 combines the subject matter of claims 8, 11 and 12 as they existed prior to the amendments presented herein. As such, new claim 12 includes a modulating valve for regulating cooling liquid flow through the heat exchanger; a temperature sensor sensing temperature of the air exiting the heat exchanger; and a temperature controller modulating the valve in response to the temperature exiting the heat exchanger.

New claim 22 combines the subject matter of claims 16 and 17 as they existed prior to the amendments presented herein. New claim 22 is thus intended to represent claim 17 in independent form.

Applicant therefore believes that new claims 20-22 are allowable in accordance with section 10 of the office action.

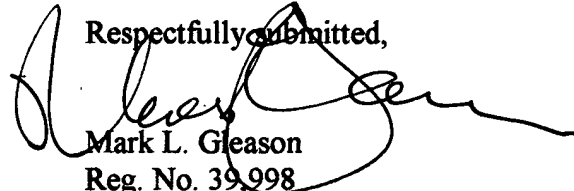
New Claims

New claims 20-23 have been added herein. Claims 20-22 were addressed above in the "Allowable subject matter" section. Claim 23 is believed to be allowable over the prior art cited in the office action. Claim 23 recites a method that includes controlling the cooling liquid to maintain the air returning to the environment containing the enclosure at a temperature above a saturation temperature of air in the environment containing the enclosure. None of the references identified in the office action appear to teach or suggest such a method.

Conclusion

As evidenced by the foregoing amendments and remarks, Applicants have made a genuine effort to address each concern raised in the office action. All of the pending claims are believed to be in condition for allowance. The Examiner is invited to contact the undersigned attorney with any concerns or questions regarding the present application.

Respectfully submitted,



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